UNC CHARLOTTE
The WILLIAM STATES LEE COLLEGE *of* ENGINEERING

Senior Design Project Description for SPRING 2017
Project Title: Rotary Assembly Fixture for HQ2/U (BR_ROTFIX)

Supporter: Bosch Rexroth

Supporter Technical Representative: Assigned

Faculty Mentor: _____ ASSIGNED __X__ TBD (check one)

Single Team __X__ Dual Team _____ (check one)

Personnel (EN/ET): _____ E, _____ Cp, _____ Cv, __3__ M, __1__ SE

(Complete if the number of students required is known)

Expected person-hours: (250 per student)

Description of Project:

The Bosch Rexroth HQ2/U Lift-Transfer Unit is a component of a conveyor system used to transfer conveyor pallets off the conveyor in a direction perpendicular to its travel. This is sometimes done to move a pallet to another conveyor or to park the pallet in a position in which work is to be done to the item being conveyed. The pallet sizes involved in the HQ2/U series range from 400mm x 400mm to 1040mm x 1040mm.

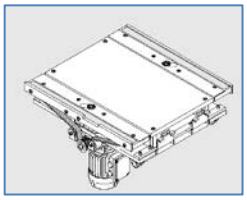

Figure 1 - HQ2/U Lift-Transfer Unit

Due to the sizes and configurations of the HQ2/U units, it is necessary to use a fixture to hold the components in the proper alignment during assembly. Bosch Rexroth currently utilizes an existing assembly fixture, but it has some significant short-comings:

1. The existing fixture does not accommodate the 400mm x 400mm size.
2. The existing fixture requires the operator to reach out in a manner that is not ergonomically sound, and creates risk of back injury.
3. The fixture requires that operators team up to flip the assembly so that additional work can be done to the bottom side of the assembly.

Bosch Rexroth desires that students design a new assembly fixture that resolves the previously mentioned problems. There is particular interest in a rotary assembly fixture which will allow an operator to work on both sides of the HQ2/U unit without having to remove it from the fixture.

The images below are provided only as examples of rotary fixtures, but this should not constrain student ideas and creativity.

Initial Project Requirements (e.g. weight, size, etc.):

The assembly fixture must have the following design characteristics:

- The maximum footprint of the assembly fixture shall be 48” x 48”.
- The fixture must have a design load capacity of 300 lbs.
- Whenever possible, the system should utilize Bosch Rexroth components (linear guide rails, aluminum extrusion framing, etc.)
- The fixture must be adjustable to accommodate the full range of product sizes, currently from 400 x 400mm to 1040 x 1040mm. Specific dimensional information will be provided by Bosch Rexroth.
- The fixture must ensure proper alignment (squareness) and rigidity to ensure consistent quality of the assembled product.

Safety Considerations

- The fixture must provide secure fastening of the assembled unit to ensure that it will not fall off the fixture in any position, which could possibly injure the operator and/or damage the unit.
- At no time shall an operator have to exert more than 25 lbs. of force to rotate / move / operate the assembly fixture.
- In the event of an unbalanced loading, the fixture must incorporate a method of preventing unwanted rotation which could create injury to the operator.
- The assembly fixture must incorporate a stable base that will not allow it to fall over and/or shift position while in use.

UNC CHARLOTTE
The WILLIAM STATES LEE COLLEGE *of* ENGINEERING

Expected Deliverables/Results:

1. Full set of 2D drawings for all machined or fabricated parts.
2. Complete CAD model in SolidWorks format. Creo is an acceptable format, but not preferred.
3. Full bill of materials which includes description, quantity, and source of supply.
4. One written procedure describing the setup and operation of the fixture.
5. One complete assembly fixture.

List here any specific skills or knowledge needed or suggested (If none please state none):

1. Machining
2. 3D CAD modeling